WHAT IS CLAIMED IS:

1. A sequentially joined-segment stator coil of a rotary electrical machine comprising:

a stator core having opposed ends and slots formed at given intervals in a circumferential direction of the stator core, each of the slots defining therein even segment-inserted positions which are aligned in a radius direction of said stator core; and

a plurality of segments placed in the slots of said stator core, said segments being joined in sequence to form turns of each of *M* (= an integer more than two) phase coils, each of said segments including a pair of conductor portions each of which is inserted into one of two of the slots spaced from each other at a given interval, a head portion extending from the pair of conductor portions outside one of the ends of said stator core to form a segment head-side coil end, and a pair of end portions each of which extends from one of the pair of conductor portions outside the other end of said stator core to form a segment end-side coil end, each of the head portions being made up of a substantially U-shaped tip portion and a pair of slant portions which continue from ends of the head portion, slant to a circumferential and an axial direction of said stator core, and lead to the conductor portions, respectively, each of the end portions being made up of slant end portions slanting from said two of the slots to the circumferential and axial directions and tips each of which continues from one of the slant end portions and is joined to one of the tips of the end portions of another of the segments, the segment

head-side coil end including a plurality of sets of the head portions arrayed in the radius direction of the stator core, as viewed in the circumferential direction of the stator core, the segment end-side coil end including a plurality of sets of the end portions arrayed in the radius direction, as viewed in the circumferential direction of the stator core,

wherein each of the tip portions of the head portions of said segments bulges more than a corresponding one of the pairs of conductor portions in the radius direction of said stator core, a radius-wise pitch between two of the tip portions adjacent to each other in the radius direction being greater than a width of the tip portions in the radius direction, and

wherein a radius-wise pitch between the slant portions of two of the head portions arrayed adjacent to each other in the radius direction of said stator core is smaller than the width of the tip portions in the radius direction.

2. A sequentially joined-segment stator coil as set forth in claim 1, wherein said radius-wise pitch between the adjacent two head portions at the slant portions thereof increases as getting away from the end of said stator core in an axial direction of said stator core, and wherein outside ones of the pairs of slant portions of the head portions in the radius direction of said stator core lean outwardly at an angle to an axial direction of said stator core which is greater than that of inside ones of the slant portions.

3. A sequentially joined-segment stator coil as set forth in claim 1, wherein said radius-wise pitch between the adjacent two head portions at the slant portions thereof increases as getting away from the end of said stator core in an axial direction of said stator core, and wherein inside ones of the pairs of slant portions of the head portions in the radius direction of said stator core lean inwardly at an angle to an axial direction of said stator core which is greater than that of outside ones of the slant portions.

4. A sequentially joined-segment stator coil as set forth in claim 1, wherein the slant portions of the head portions are bent or curved in the radius direction of said stator core.

5. A sequentially joined-segment stator coil as set forth in claim 1, wherein said segments are broken down into a plurality of segment sets each made up of a small-sized segment with a small head and a large-sized segment with a large head extending over the small head of the small-sized segment in the circumferential direction of the stator core, the segment sets being broken down into a plurality of segment set groups arrayed in the radius direction of the stator core, the segment sets in each of the segment set groups being arrayed in the circumferential direction of the stator core, each of the segment set groups forming partial phase windings to which given phase voltages are applied, respectively, and wherein each of the phase coils includes ones of the partial phase windings which are arrayed in the radius direction of the stator core and joined in

series.

6. A sequentially joined-segment stator coil as set forth in claim 5, wherein the slots are broken down into same phase slot groups each of which has placed therein the conductor portions of the segments to which the same phase voltage is applied, the slots in each of the same phase slot groups being arrayed adjacent to each other in the circumferential direction of the stator core, and wherein the partial phase windings arrayed in the radius direction of the stator core within each of the slots of each of the same phase slot groups are joined in series to form a series-connected phase coil circuit, the series-connected phase coil circuits placed respectively within the slots of each of the same phase slot groups being joined in parallel to form each of the phase coils.

7. A sequentially joined-segment stator coil of a rotary electrical machine comprising:

a stator core having opposed ends and slots formed at given intervals in a circumferential direction of the stator core, each of the slots defining therein even segment-inserted positions which are aligned in a radius direction of said stator core; and

a plurality of segments placed in the slots of said stator core, said segments being joined in sequence to form turns of each of M (= an integer more than two) phase coils, each of said segments including a pair of conductor portions each of which is inserted into one of two of the slots spaced from each other at a given interval, a

head portion extending from the pair of conductor portions outside one of the ends of said stator core to form a segment head-side coil end, and a pair of end portions each of which extends from one of the pair of conductor portions outside the other end of said stator core to form a segment end-side coil end, each of the head portions being made up of a substantially U-shaped tip portion and a pair of slant portions which continue from ends of the head portion, slant to a circumferential and an axial direction of said stator core, and lead to the conductor portions, respectively, each of the end portions being made up of slant end portions slanting from said two of the slots to the circumferential and axial directions and tips each of which continues from one of the slant end portions and is joined to one of the tips of the end portions of another of the segments, the segment head-side coil end including a plurality of sets of the head portions arrayed in the radius direction of the stator core, as viewed in the circumferential direction of the stator core, the segment end-side coil end including a plurality of sets of the end portions arrayed in the radius direction, as viewed in the circumferential direction of the stator core,

wherein each of the tip portions of the head portions of said segments bulges more than a corresponding one of the pairs of conductor portions in the radius direction of said stator core, a radius-wise pitch between two of the tip portions adjacent to each other in the radius direction being smaller than a width of the tip portions in the radius direction, and

wherein sections of the tip portions having a maximum width

in the radius direction of said stator core are shifted in location from each other in the axial direction of said stator core.

8. A sequentially joined-segment stator coil as set forth in claim 7, wherein two of the tip portions of the head portions arrayed adjacent to each other in the radius direction of said stator core are shifted from each other in the axial direction of said stator core a distance longer than a length of the tip portions in the axial direction of said stator core.

9. A sequentially joined-segment stator coil as set forth in claim 7, wherein said segments are broken down into a plurality of segment sets each made up of a small-sized segment with a small head and a large-sized segment with a large head extending over the small head of the small-sized segment in the circumferential direction of the stator core, the segment sets being broken down into a plurality of segment set groups arrayed in the radius direction of the stator core, the segment sets in each of the segment set groups being arrayed in the circumferential direction of the stator core, each of the segment set groups forming partial phase windings to which given phase voltages are applied, respectively, and wherein each of the phase coils includes ones of the partial phase windings which are arrayed in the radius direction of the stator core and joined in series.

10. A sequentially joined-segment stator coil as set forth in claim

9, wherein the slots are broken down into same phase slot groups each of which has placed therein the conductor portions of the segments to which the same phase voltage is applied, the slots in each of the same phase slot groups being arrayed adjacent to each other in the circumferential direction of the stator core, and wherein the partial phase windings arrayed in the radius direction of the stator core within each of the slots of each of the same phase slot groups are joined in series to form a series-connected phase coil circuit, the series-connected phase coil circuits placed respectively within the slots of each of the same phase slot groups being joined in parallel to form each of the phase coils.

11. A sequentially joined-segment stator coil of a rotary electrical machine comprising:

a stator core having opposed ends and slots formed at given intervals in a circumferential direction of the stator core, each of the slots defining therein even segment-inserted positions which are aligned in a radius direction of said stator core; and

a plurality of segments placed in the slots of said stator core, said segments being joined in sequence to form turns of each of *M* (= an integer more than two) phase coils, each of said segments including a pair of conductor portions each of which is inserted into one of two of the slots spaced from each other at a given interval, a head portion extending from the pair of conductor portions outside one of the ends of said stator core to form a segment head-side coil end, and a pair of end portions each of which extends from one of the

pair of conductor portions outside the other end of said stator core to form a segment end-side coil end, each of the head portions being made up of a substantially U-shaped tip portion and a pair of slant portions which continue from ends of the head portion, slant to a circumferential and an axial direction of said stator core, and lead to the conductor portions, respectively, each of the end portions being made up of slant end portions slanting from said two of the slots to the circumferential and axial directions and tips each of which continues from one of the slant end portions and is joined to one of the tips of the end portions of another of the segments, the segment head-side coil end including a plurality of sets of the head portions arrayed in the radius direction of the stator core, as viewed in the circumferential direction of the stator core, the segment end-side coil end including a plurality of sets of the end portions arrayed in the radius direction, as viewed in the circumferential direction of the stator core,

wherein each of the tip portions of the head portions of said segments bulges more than a corresponding one of the pairs of conductor portions in the radius direction of said stator core, a radius-wise pitch between two of the tip portions adjacent to each other in the radius direction being smaller than a width of the tip portions in the radius direction, and

wherein sections of the tip portions having a maximum width in the radius direction of said stator core are shifted in location from each other in the circumferential direction of said stator core.

12. A sequentially joined-segment stator coil as set forth in claim 11, wherein two of the tip portions of the head portions arrayed adjacent to each other in the radius direction of said stator core are shifted from each other in the circumferential direction of said stator core a distance longer than a length of the tip portions in the circumferential direction of said stator core.

13. A sequentially joined-segment stator coil as set forth in claim 11, wherein said segments are broken down into a plurality of segment sets each made up of a small-sized segment with a small head and a large-sized segment with a large head extending over the small head of the small-sized segment in the circumferential direction of the stator core, the segment sets being broken down into a plurality of segment set groups arrayed in the radius direction of the stator core, the segment sets in each of the segment set groups being arrayed in the circumferential direction of the stator core, each of the segment set groups forming partial phase windings to which given phase voltages are applied, respectively, and wherein each of the phase coils includes ones of the partial phase windings which are arrayed in the radius direction of the stator core and joined in series.

14. A sequentially joined-segment stator coil as set forth in claim 13, wherein the slots are broken down into same phase slot groups each of which has placed therein the conductor portions of the segments to which the same phase voltage is applied, the slots in

each of the same phase slot groups being arrayed adjacent to each other in the circumferential direction of the stator core, and wherein the partial phase windings arrayed in the radius direction of the stator core within each of the slots of each of the same phase slot groups are joined in series to form a series-connected phase coil circuit, the series-connected phase coil circuits placed respectively within the slots of each of the same phase slot groups being joined in parallel to form each of the phase coils.

15. A production method of the sequentially joined-segment stator coil as set forth in claim 2 comprising:

preparing conductor segments each including a head and a pair of legs extending from ends of the head;

preparing a plurality of rings arrayed coaxially with each other to be rotatable relative to each other;

holding portions of the legs of each of the conductor segments in the rings, respectively, which make the conductor portions placed in said stator core;

leaning the heads of the conductor segments outwardly of the rings simultaneously; and

rotating the rings to spread end portions of each of the heads of the conductor segments to complete the slant portions of a corresponding one of the head portions of said segments.

16. A production method as set forth in claim 15, further comprising preparing a head press member having formed therein a

frusto-conical protrusion to define a tapered peripheral surface, and wherein the leaning of the heads of the conductor segments is achieved by moving said head press member toward the rings in an axial direction of the rings to press an inner one of the end portions of each of the heads of the conductor segments outwardly in the radius direction of the rings through the tapered peripheral surface.

17. A production method as set forth in claim 16, further comprising a cylindrical stopper member working to stop the leaning of the heads of the conductor segments for avoiding an excessive inclination of the heads.

18. A production method as set forth in claim 16, wherein said conductor segments are broken down into a plurality of segment sets each made up of a small-sized conductor segment with a small head and a large-sized conductor segment with a large head extending over the small head of the small-sized conductor segment, and wherein said stopper member works to hold the small-sized head of each of the small-sized conductor segment from moving outside the large-sized head of the large-sized conductor segment in the radius direction of the rings.